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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,479	01/04/2001	Whay S. Lee	5181-68300	5090

7590 07/28/2004

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EXAMINER

WON, MICHAEL YOUNG

ART UNIT	PAPER NUMBER
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2155

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/755,479	Applicant(s) LEE, WHAY S.	
	Examiner Michael Y Won	Art Unit 2155	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/27/01, 8/13/02, 9/22/03, 10/27/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-52 have been examined.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-52 rejected under 35 U.S.C. 102(b) as being anticipated by Flaig et al. (US 5,105,424 A).

INDEPENDENT:

As per claim 1, Flaig teaches a method of sending a message in an interconnection fabric, wherein the interconnection fabric couples together a plurality of nodes, wherein each node of the plurality of nodes comprises a plurality of input ports and a plurality of output ports (see abstract and col.1, lines 46-61), comprising: identifying a route in the interconnection fabric for sending the message from a sending node to a destination node (see col.1, lines 50-61); encoding (see col.6, lines 14-15) a routing directive in the message, wherein the routing directive describes the route and

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comprises at least one segment, wherein each segment comprises a direction component (see col.4, lines 55-57) and a distance component (see col.7, lines 27-33 & 41-48); sending the message on one of the output ports of the sending node (see col.4, lines 57-60 and col.7, lines 12-16); receiving the message on one of the input ports of a first node connected to the output port of the sending node (inherent); decrementing the distance component for a current segment of the routing directive (see col.7, lines 50-52); selecting one of the output ports of the first node according to the current segment of the routing directive in the message (see Figs.4-6; col.6, lines 55-57; and col.7, lines 19-27); and sending the message on the selected one of the output ports of the first node (see col.4, lines 57-60 and col.7, line 68 to col.8, line 2).

As per claim 22, Flaig teaches of a node comprising: a routing unit (see col.1, lines 50-61 and col.4, lines 51-52); a plurality of input ports (see Figs.4-6 and col.1, lines 46-55); and a plurality of output ports (see Figs.4-6 and col.1, lines 46-55); wherein the node is configured to be connected to an interconnection fabric, wherein the interconnection fabric is configured to connect the node to a plurality of nodes (see col.4, lines 51-55); wherein the routing unit is configured to receive a message being sent along a route from a sending node to a destination node in the interconnection fabric (see col.4, lines 55-57 and col.7, lines 33-37); wherein the routing unit is further configured to receive a routing directive encoded (see col.6, lines 14-15) in the message, wherein the routing directive describes the route and comprises at least one segment, and wherein a segment comprises a direction component (see col.4, lines 55-

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57) and a distance component (see col.7, lines 27-33 & 41-48); and wherein the node is configured to receive the message on one of the input ports when the node is not the sending node (see col.4, lines 51-60), wherein the node is further configured to decrement the distance component of a current segment of the routing directive (see col.7, lines 50-52) and to select one of the output ports according to the current segment (see col.4, lines 57-60 and col.7, line 68 to col.8, line 2).

As per claim 39, Flaig teaches of a device comprising: an interface configured to communicate with a source node in an interconnection fabric (see col.4, lines 63-66), wherein the interconnection fabric comprises a plurality of routes between the source node and a destination node (see Fig.8 and col.7, line 41 to col.8, lines 4); and a controller configured to provide a first routing directive describing a first route from the source node to the destination node (see col.4, lines 51-52), wherein the routing directive comprises at least one segment, wherein each segment comprises a distance component (see col.7, lines 27-33 & 41-48) and a direction component (see col.4, lines 55-57), wherein the distance component is configured to be decremented by a receiving node (see col.7, lines 50-52); and wherein the controller is further configured to encode (see col.6, lines 14-15) the first routing directive in a message, and to communicate the message to the source node to be sent on the interconnection fabric to the destination node (see col.7, line 41 to col.8, lines 4).

DEPENDENT:

As per claims 2, 5, and 26, Flaig further teaches wherein said selecting by the node comprises: if, after said decrementing, the distance component for the current segment is greater than zero, selecting the output port corresponding to a same routing direction in which the message was traveling when received; and if, after said decrementing, the distance component for the current segment is zero, selecting the output port corresponding to the direction component of the current segment (see col.3, lines 17-20 and col.7, line 48 to col.8, line 17).

As per claims 3 and 27, Flaig further teaches wherein if, after said decrementing, the distance component for the current segment is zero, and the output port is selected according to the direction component of the current segment, the method further comprises removing by the node the current segment from the routing directive so that a next segment becomes the current segment when the message is sent on the selected output port (see col.3, lines 17-20).

As per claims 4 and 28, Flaig further teaches wherein the routing directive further comprises a pointer to the current segment, and wherein said removing the current segment comprises moving the pointer to the next segment (see col.11, lines 12-13).

As per claim 6, Flaig further teaches wherein the subsequent node selecting a port corresponding to the direction component comprises: selecting the corresponding output port if the direction component for the current segment specifies a routing direction; and selecting a device port if the direction component for the current

segment specifies that the subsequent node is the destination for the message (see col.7, lines 22-25).

As per claims 7, 30, and 43, Flaig further teaches wherein said identifying the route comprises selecting the routing directive from a routing table (see abstract).

As per claims 8 and 31, Flaig further teaches wherein the routing table comprises a plurality of independent routes from the sending node to the destination node (see abstract).

As per claims 9 and 32, Flaig further teaches wherein the interconnection fabric is a torus interconnection fabric (see Fig.3 and col.2, lines 57-65).

As per claims 10 and 33, Flaig teaches of further comprising: if the node is the sending node, identifying a return route from the destination node to the sending node; and encoding a return routing directive in the message, wherein the return routing directive describes the return route and comprises at least one segment, wherein each segment comprises a direction component and a distance component (see col.4, lines 2-5 and col.9, lines 57-66).

As per claims 11 and 34, Flaig teaches of further comprising if the node is the sending node, the routing unit is further configured to calculate the return routing directive (see col.4, lines 2-5).

As per claims 12, and 35, Flaig further teaches wherein the interconnection fabric is bi-directional, and wherein calculating the return routing directive comprises reversing the routing directive (see col.3, lines 37-44 and col.5, lines 12-20).

As per claim 13 and 47, Flaig teaches of further comprising wherein the controller is further configured to incrementally encode a return routing directive in the message, wherein the return routing directive describes a return route from the destination node to the sending node and comprises at least one segment, and wherein each segment comprises a direction component and a distance component (see col.11, lines 21-26 and col.8, lines 9-17).

As per claim 14, Flaig further teaches wherein incrementally encoding comprises: incrementing the distance component for a current segment of the return routing directive; wherein if, after said decrementing, the distance component for the current segment of the routing directive is zero, the method further comprises modifying the direction component of a current segment of the return routing directive and adding a new segment to the return routing directive so that the new segment becomes the current segment of the return routing directive when the message is sent on the selected output port (see col.3, lines 17-20):

As per claim 15, Flaig further teaches wherein the return routing directive further comprises a pointer to the current segment, wherein adding a new segment to the return routing directive further comprises moving the pointer to the new segment (see col.11, lines 12-13).

As per claims 16 and 45, Flaig further teaches wherein a first number of segments of a first routing directive differ from a second number of segments of a second routing directive (see col.4, line 50 to col.5, line 19).

As per claim 17, Flaig teaches of further comprising a subsequent node receiving the message and, if all of the segments of the routing directive have been removed, the subsequent node identifying itself as the destination node and selecting a device port (see col.5, lines 2-8).

As per claim 18, Flaig further teaches wherein each direction component comprises a direction relative to a routing direction the message was traveling in when received (see col.4, lines 50-62).

As per claim 19, Flaig further teaches wherein each direction component comprises an identifier of one of the output ports of one of the nodes (see col.1, lines 57-59).

As per claims 20, 21, 37, 38, and 42, Flaig further teaches wherein the destination node is configured to communicate with a storage device comprising a disk drive (see col.5, lines 6-8).

As per claim 23, Flaig further teaches wherein the routing unit is configured to identify the route and to encode the routing directive in the message when the node is the sending node, and wherein the node is configured to send the message on one of the output ports (see col.4 and 5: Summary).

As per claim 24, Flaig further teaches wherein the node is configured to communicate with a device on a device port, wherein the device is configured to select a route, encode a routing directive in the message and communicate the message to the node on the device port when the node is the sending node (see abstract).

As per claim 25, Flaig further teaches wherein the node is further configured to select one of the output ports according to the current segment (see col.5, lines 58-62).

As per claim 29, Flaig further teaches wherein the node is configured to select: one of the output ports corresponding to a same routing direction in which the message was traveling when received if, after said decrementing, the distance component for the current segment is greater than zero; one of the output ports corresponding to the direction component of the current segment if, after said decrementing, the distance component for the current segment is zero, and if the direction component for the current segment does not identify that the node is the destination node; and a device port if, after said decrementing, the distance component for the current segment is zero and if the direction component for the current segment identifies that the node is the destination node (see claim 17 and 26 rejection above).

As per claims 36 and 40, Flaig further teaches wherein the node is configured to communicate with a controller that is a RAID controller (see col.8, lines 15-17).

As per claim 41, Flaig further teaches wherein the controller comprises a host interface configured to communicate with a host computer (see col.4, lines 45-49).

As per claim 44, Flaig further teaches wherein the routing table further comprises a second routing directive describing a second route from the source node to the destination node (see col.7, lines 16-25).

As per claim 46, Flaig further teaches wherein the controller is further configured to calculate the first routing directive (see col.4, lines 46-62).

As per claim 48, Flaig further teaches wherein the controller is further configured to select the return routing directive from a routing table (see col.4, lines 46-62).

As per claim 49, Flaig further teaches wherein the controller is further configured to calculate the return routing directive from the first routing directive (see col.4, lines 46-62).

As per claim 50, Flaig further teaches wherein the controller is further configured to encode a return routing direction describing a return route from the destination node to the source node in the message, and wherein the return routing directive is configured to be incrementally added to, as the message is routed to the destination node (see col.4, lines 46-62).

As per claim 51, Flaig further teaches wherein the return routing directive is further configured to return an error message to the source node if a routing error is encountered (see col.9, lines 57-62).

As per claim 52, Flaig further teaches wherein the controller is further configured to use the incrementally created return routing directive to locate the routing error if an error message is returned, wherein the incrementally created return routing directive indicates a last node that successfully received the message (see col.9, lines 57-62).

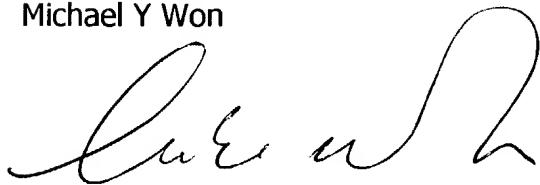
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3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Y Won whose telephone number is 703-605-4241. The examiner can normally be reached on M-Th: 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain T Alam can be reached on 703-308-6662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Y Won



July 20, 2004


HOSAIN ALAM
SUPERVISORY PATENT EXAMINER